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EXAMINER	
LEE, SIU M	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/700,310	Applicant(s) ROBINSON, IAN
	Examiner SIU M. LEE	Art Unit 2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 June 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-5,7-11,34,37,44 and 48-64* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-5,7-11,34,37,44 and 48-64* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1, 3-5, 7-11, 34, 37, 44, 48-64 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 56 is rejected under 35 U.S.C. 102(b) as being anticipated by Caimi et al. (US 2002/0122008 A1).

Caimi et al. discloses a receiver assembly comprising:

a plurality of antennas (integrated assembly 150 in figure 13) that each receive an analog signal comprising at least one frequency band of interest and at least one frequency band containing an interfering signal (it is inherent that each antenna can received an analog signal comprising at least one frequency band of interest and at least one frequency band containing an interfering signal);

an analog-to-digital converter (plurality of A/D 166 each associated with an integrated assembly 150 as shown in figure 13) that creates a digital representation of each analog signal;

a digital processing component (a control processor (not shown in figure 13), paragraph 0039, lines 31-34) that receives the digital representation of each analog signal and produces a control signal from each digital representation, representing an associated antenna (control signal 137 in figure 10 is generated by the transmitter/receiver 130, and another embodiment shown in figure 13 shown that the received signals from each integrated assembly 150 passed through an A/D 166 before the receiver/transmitter block, therefore, the control signal 153 is produce from each digital representation representing an associated antenna), specifying the at least one frequency band containing the interfering signal (filter 132 may additionally comprises a notch at the frequency of a nearby emitter, or at the frequency of an intermodulation product, paragraph 0035; a control processor controls the parameters of the digital filters 170 and the phase shifters 172 to select or reject a particular signal, paragraph 0039); and

a plurality of electrically adjustable passband filters (digital adjustable filters 170 in figure 13), each electrically adjustable passband filter being associated with one of the plurality of antennas (each filter 170 is associated with an integrated assembly 150 as shown in figure 13), a given electrically adjustable passband filter being electrically adjustable to change respective associated center frequencies of at least one passband associated with the filter in response to the control signal associated with the associated antenna of the given adjustable filter as to attenuate the specified at least one frequency band within the analog signal received at the associated antenna of the given adjustable filter (the filter in the integrated assembly may additionally comprises a notch at the

frequency of a nearby emitter, or at the frequency of an intermodulation product, paragraph 0035; a control processor controls the parameters of the digital filters 170 and the phase shifters 172 to select or reject a particular signal, paragraph 0039).

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 4, 5, 7, 34, 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caimi et al. (US 2002/0122008 A1) in view of Rybicki et al. (US 7,184,490 B1). .

(1) Regarding claim 1:

Caimi et al. discloses a transmitter assembly, comprising:

a digital exciter (transmitter 130 in figure 10) that provides a digital signal;

a signal distributor (summer 176, digital filters 170 and phase shifters 172 in figure 13) that deserializes the digital signal into a plurality of digital carrier signals (the examiner interprets deserialize as put a serial signal into a plurality of parallel signal) (in the transmission path, the summer 176 split the signal from the transmitter in the transmitting mode and feed the split signals to the phase shifters and digital filters, each of the phase shifters and the digital filters are independently control by the control signal

from a control processor (not shown) to select or reject a particular signal, paragraph 0039, lines 31-34) , the signal distributor comprising at least one stopband filter having at least one stopband, each of the at least one stopband having an associated center frequency, the digital exciter being operative to adjust the respective center frequencies of the at least one stopband (as the digital filter are controlled by a control signal from the transmitter to reject a particular signal, therefore, they can be adjusted to function as a stopband filter having an associated center frequency, paragraph 0039, lines 31-34); and

a digital-to-analog converter that converts the digital multi-carrier signal into an analog multi-carrier signal (A/D 166 in the transmitting mode as shown in figure 13);

a plurality of antennas, each of the plurality of antennas transmitting at least one of the plurality of analog carrier signals (integrated assembly 150 in figure 13, each of the integrated assembly 150 transmit a signal from the D/A 166).

Caimi fails to explicitly disclose (a) a digital exciter that provides a digital multi-carrier signal from baseband signal, and (b) convert the digital signal from the exciter to analog before the signal distributor.

With respect to (a), Rybicki et al. discloses a signal generator 12 (figure 9) that receives data 26 and generate OFDM signal (column 4, lines 51-64).

It is desirable to use multi-carrier signal for transmission because it improves the transmission rate. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Rybicki et al. in the system of Caimi et al. to increase the transmission rate of the system.

With respect to (b), the two different configurations; convert the signal before distribution and convert the signal after distribution, produce the same output signal; which is analog distributed signal; the two configurations are functional equivalent. The limitation of digital-to-analog convert the signal before signal distribution do not define a patentably distinct invention over Caimi et al. since both invention as a whole are directed to generate analog distributed signals. Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention was made to digital-to-analog convert the signal before signal distribution, since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art. In re Einstein , 8 USPQ 167.

(2) Regarding claim 4:

Caimi et al. discloses the signal distributor further comprising at least one passband filter having at least one passband (the digital filter can b adjusted to select a particular signal, paragraph 0039, lines 34-37), each of the at least one passband having an associated center frequency (it is inherent that each passband filter would have a center frequency), the digital exciter being operative to adjust the respective center frequency of the at least one passband (the processor (not shown) in the transmitter generates a control signal to control the characteristic of the adjustable digital filter 170 as shown in figure 13, paragraph 0039, lines 33-38, figure 10).

(3) Regarding claim 5:

Caimi et al. discloses the at least one frequency characteristic comprising a given passband filter from the at least one passband filter having a plurality of passbands,

each of the respective center frequencies of a the plurality of passbands frequency of each passband being electrically adjustable by the exciter (the characteristic of the adjustable digital filters 170 can be adjust by the control signal from a processor in the transmitter (figure 10, paragraph 0039, lines 31-37), since the frequency selection can be adjust, therefore, it would have been obvious to one of ordinary skill in the art at the time of invention that the adjustable digital filter can be adjusted to have a plurality of passband frequency).

(4) Regarding claim 7:

Caimi et al. discloses a given stopband filter (band reject) from the at least one passband filter having a plurality of stopbands, each of the respective center frequencies of the plurality of stopbands being electrically adjustable by the exciter (the characteristic of the adjustable digital filters 170 can be adjust by the control signal from a processor in the transmitter (figure 10, paragraph 0039, lines 31-37), since the frequency rejection can be adjust, therefore, it would have been obvious to one of ordinary skill in the art at the time of invention that the adjustable digital filter can be adjusted to have a plurality of stopband frequency)

(5) Regarding claim 34:

Caimi et al. discloses a method of transmitting a multi-carrier signal, comprising:

generating a digital signal at an exciter (transmitter 130 in figure 10);

distributing the digital multi-carrier signal into a plurality of digital signals, where distributing the analog multi-carrier signal comprises filtering a plurality of copies of the digital signal at respective tunable filters, at least one of the tunable filters being a

multiband tunable filter (in the transmission path, the summer 176 split the signal from the transmitter in the transmitting mode and feed the split signals to the phase shifters and digital filters, each of the phase shifters and the digital filters are independently control by the control signal from a control processor (not shown) to select or reject a particular signal, paragraph 0039, lines 31-34) (as the digital filter are controlled by a control signal from the transmitter to select a particular signal, therefore, they can be adjusted to function as a mutliband adjustable filter, paragraph 0039, lines 31-34);

converting the digital signal into an analog signal (A/D 166 in the transmitting mode as shown in figure 13); and

providing the plurality of analog signals to respective antennas for transmission (integrated assembly 150 in figure 13, each of the integrated assembly 150 transmit a signal from the D/A 166).

Caimi et al. fails to explicitly disclose (a) generating a digital multi-carrier signal at an exciter, and (b) convert the digital signal from the exciter to analog before the signal distributor.

With respect to (a), Rybicki et al. discloses a signal generator 12 (figure 9) that receives data 26 and generate OFDM signal (column 4, lines 51-64).

It is desirable to use multi-carrier signal for transmission because it improves the transmission rate. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Rybicki et al. in the system of Caimi et al. to increase the transmission rate of the system.

With respect to (b), the two different configurations; convert the signal before distribution and convert the signal after distribution, produce the same output signal; which is analog distributed signal; the two configurations are functional equivalent. The limitation of digital-to-analog convert the signal before signal distribution do not define a patentably distinct invention over Caimi et al. since both invention as a whole are directed to generate analog distributed signals. Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention was made to digital-to-analog convert the signal before signal distribution, since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art. In re Einstein , 8 USPQ 167.

(6) Regarding claim 37:

Caimi et al. discloses the distribution of the analog multi-carrier signal comprising deserializing a plurality of carrier signals comprising the multi-carrier signal (the examiner interprets deserialize as put a serial signal into a plurality of parallel signal) (in the transmission path, the summer 176 split the signal from the transmitter in the transmitting mode and feed the split signals to the phase shifters and digital filters, each of the phase shifters and the digital filters are independently control by the control signal from a control processor (not shown) to select or reject a particular signal, paragraph 0039, lines 31-34).

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Caimi et al. (US 2002/0122008 A1) in view of Rybicki et al. (US 7,184,490 B1) as applied to claim 1 above, and further in view of Lau et al. (US 6,291,924 B1).

Caimi et al. and Rybicki et al. disclose all the subject matter as discuss in claim 1 except the at least one stopband filter comprising a surface acoustic wave (SAW) filter having at least one electrically actuatable micromechanical structures.

However, Lau et al. discloses a surface acoustic wave (SAW) filter having at least one electrically actuatable micromechanical structures (column 9, lines 9-14, line 59-column 10, line 24, and figure 22).

It is desirable to surface acoustic wave (SAW) filter having at least one electrically actuatable micromechanical structures because it avoids the need to fabricate a new SAW device (column 1, lines 62-63). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Lau et al. in the system of Caimi et al. and Rybicki et al. to improve the flexibility of the system.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Caimi et al. (US 2002/0122008 A1) in view of Rybicki et al. (US 7,184,490 B1) as applied to claim 1 above, and further in view of Jago et al. (US 2003/0171674 A1).

Caimi et al. and Rybicki et al. discloses all the subject matter as discuss in claim 1 except the signal distributor comprising a time division demultiplexer.

However, Jago et al. discloses the signal distributor (signal separator 56) comprising a time division demultiplexer (the signal separator 56 in figure 3 is implemented using a time-division demultiplexer 64, paragraph 0022, lines 4-5).

It is desirable for the signal distributor comprising a time division demultiplexer because it simplified the system and reduce the hardware required (paragraph 0009, lines 1-6). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Jago et al. in the system of Caimi et al. and Rybicki et al. to simplify the system.

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Caimi et al. (US 2002/0122008 A1) in view of Rybicki et al. (US 7,184,490 B1) as applied to claim 1 above, and further in view of Pratt (US 6,664,921 B2).

Caimi et al. and Rybicki et al. discloses all the subject matter as discuss in claim 1 except the signal distributor comprising a plurality of decoders, providing respective despreading codes to a multi-carrier signal.

However, Pratt discloses the signal distributor (plurality of channel 167) comprising a plurality of decoders, providing respective despreading codes to a multi-carrier signal (the plurality of channels 167 each containing a mixer 167A which receives the same respective code as that applied in respect of the relevant antenna in mixer 150C, this has the effect of isolating the representation of the respective received signal at the output of the mixer 167A, this output representation then being split into plural sub-channel 169, column 10, lines 3-10).

It is desirable for the signal distributor comprising a plurality of decoders, providing respective despreading codes to a multi-carrier signal because it improves the phase tracking accuracy (column 2, lines 60-64). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Pratt in the system of Caimi et al. and Rybicki et al. to improve the performance of the system.

6. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caimi et al. (US 2002/0122008 A1) in view of Rybicki et al. (US 7,184,490 B1) as applied to claim 1 above, and further in view of Naidu et al. (US 5,805,983).

(1) Regarding claim 10:

Caimi et al. and Rybicki et al. discloses all the subject matter as discuss in claim 1 except the exciter and the digital-to-analog converter being located at a first location, and at least one of the pluralities of antennas being located at a second location, spatially remote from the first location.

However, Naidu et al. discloses the exciter and the digital-to-analog converter being located at a first location, and at least one of the plurality of antennas being located at a second location, spatially remote from the first location (base station 50_1 and 50_2 are connected to the remote antenna 68_1, 68_2, 70_1 and 70_2 through fiber node 58 and coaxial cable 60, column 1, line 58-column 2, line1).

It is desirable for the exciter and the digital-to-analog converter being located at a first location, and at least one of the plurality of antennas being located at a second

location, spatially remote from the first location because it enhanced the air frame timing between cells served by the remote antenna unit (column 1, lines 24-26). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Naidu et al. in the system of Caimi et al. and Rybicki et al. to improve the performance of the system.

(2) Regarding claim 11:

Caimi et al and Rybicki et al. discloses all the subject matter as discuss in claim 1 except at least one antenna being located at a third location, spatially remote from the first location and the second location.

However, Naidu et al. disclose at least one antenna being located at a third location, spatially remote from the first location and the second location (as shown in figure 3, each of the four transmission paths may have different length which cause different delay time for the signal, column 2, lines 50-52).

It is desirable for at least one antenna being located at a third location, spatially remote from the first location and the second location because it equalizes the system without requiring the transmission link to be out of service during the upgrades or repairs (column 9, lines 26-30). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Naidu et al. in the system of Caimi et al. and Rybicki et al. to improve the reliability of the system.

7. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Caimi et al. (US 2002/0122008 A1) in view of Nuutinen et al. (US 2003/0016771 A1).

Caimi et al. discloses a receiver assembly, comprising:

a plurality of antennas that each receive an analog signal comprising at least one frequency band of interest and at least one frequency band containing an interfering signal (integrated assembly 150 in figure 13, paragraph 0039, lines 6-11; it is inherent that each antenna can received an analog signal comprising at least one frequency band of interest and at least one frequency band containing an interfering signal);

an analog-to-digital converter that creates a digital representation of each analog signal (A/D 166 are associated with each of the receiving antenna in the integrated assembly 150 as shown in figure 13)

a digital processing component (a control processor (not shown in figure 13), paragraph 0039, lines 31-34) that receives a representation of each analog signal (as shown in figure 10, the receiver/transmitter receives the a representation of each analog signal, paragraph 0034, lines 7-11) and produce a control signal from each digital representation, representing an associated antenna (control signal 137 in figure 10 is generated by the transmitter/receiver 130, and another embodiment shown in figure 13 shown that the received signals from each integrated assembly 150 passed through an A/D 166 before the receiver/transmitter block, therefore, the control signal 153 is produce from each digital representation representing an associated antenna), specifying the at least one frequency band containing the interfering signal (filter 132 may additionally comprises a notch at the frequency of a nearby emitter, or at the frequency of an intermodulation product, paragraph 0035; a control processor controls

the parameters of the digital filters 170 and the phase shifters 172 to select or reject a particular signal, paragraph 0039); and

Caimi et al. discloses a plurality of electrically adjustable digital filters (digital filter 170 in figure 13), each electrically adjustable digital filter being associated with one of the plurality of antennas (each filter 170 is associated with an integrated assembly 150 as shown in figure 13), a given electrically adjustable digital filter being electrically adjustable to change respective associated center frequencies of at least one stopband associated with the filter in response to the control signal associated with the associated antenna of the given adjustable filter as to attenuate the specified at least one frequency band within the analog signal received at the associated antenna of the given adjustable filter (the filter in the integrated assembly may additionally comprises a notch at the frequency of a nearby emitter, or at the frequency of an intermodulation product, paragraph 0035; a control processor controls the parameters of the digital filters 170 and the phase shifters 172 to select or reject a particular signal, paragraph 0039).

Caimi et al. fails to explicitly disclose a plurality of electrically adjustable stopband filter, each electrically adjustable stopband filter being associated with one of the plurality of antenna to change respective associated center frequencies of at least one stopband associated with the filter in response to the control signal

However, Nuutinen et al. discloses a receiver with band-stop filter 614 (614a and 614b in figure 6B) that is tunable to a sub-band that contain the interference and filtered out the interference signal, paragraph 0025, lines 16-18 and paragraph 0028, lines 14-19 and paragraph 0029, lines 1-9.

It is desirable to have a plurality of electrically adjustable stopband filter, each electrically adjustable stopband filter associated with one of the plurality of antenna, a given electrically adjustable stopband filter being electrically adjustable to change respective associated center frequencies of at least one stopband associated with the filter in response to the control signal associated with the associated antenna of the given adjustable filter as to attenuate the specific at least one frequency band within the analog signal received at the associated antenna of the given adjustable filter because it can filter out the interference signal. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Nuutinen et al. in the system of Caimi et al. to improve the signal quality of the system.

8. Claims 48, 49, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caimi et al. (US 2002/0122008 A1) in view of Nuutinen et al. (US 2003/0016771 A1) as applied to claim 44 above, and further in view of Pratt (US6,664,921 B2).

(1) Regarding claim 48:

Caimi et al. further disclose a signal combiner (combiner 176 in figure 13) that combines the analog signals from the plurality of antenna into a multi-carrier signal (since each integrated assembly 150 is with a different frequency response characteristics, the output of the combiner 176 is a multi-carrier signal, paragraph 0039).

Caimi et al. fails to disclose an analog-to-digital converter that converts the analog multi-carrier signal into a digital multi-carrier signal.

However, Pratt discloses an analog-to-digital filter after the combiner 155 in figure 4 that creates a digital representation of each analog signal (ADC 165 in figure 4, column 9, lines 60-65).

It is desirable to have an analog-to-digital converter that creates a digital representation of each analog signal because digital data can withstand interference better than analog signal. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the teaching of Pratt in the system of Caimi et al. and Nuutinen et al. to improve the reliability of the system.

(2) Regarding claim 49:

Pratt further discloses a combiner comprising at least one mixer (mixers 150C) for downconverting analog signals, a given mixer being associated with a respective one of the at least one antenna and having an associated intermediate frequency (the mixers 150C serve as down converters, converting the received signals to an intermediate frequency, column 9, lines 57-59).

It is desirable for the combiner comprising at least one mixer for downconverting analog signals, a given mixer being associated with a respective one of the at least one antenna and having an associated intermediate frequency because it can remove interference in the signal. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the teaching of Pratt in the system of Caimi et al. and Nuutinen et al. to improve the performance of the system.

(3) Regarding claim 52:

Pratt further discloses that the signal combiner (combiner 155 and PRBS code generator 153) comprising a plurality of coders (code 1 to K) that provide respective spreading codes to the analog carrier signals, the respective spreading codes being mutually orthogonal (column 9, lines 46-51, the despreading codes may be signals constituting an orthogonal set, column 4, lines 20-21).

It is desirable for the signal combiner comprising a plurality of coders that provide respective spreading codes to the analog carrier signals, the spreading codes being mutually orthogonal because the signal can be decoded in a noisier environment. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Pratt in the system of Caimi et al. and Nuutinen et al. to improve the performance of the system.

9. Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Caimi et al. (US 2004/0227683 A1) in view of Nuutinen et al. (US 2003/0016771 A1) and Pratt (US6,664,921 B2) as applied to claim 48 above, and further in view of Chitrapu et al. (US 2006/0072520 A1).

Caimi et al., Pratt and Chitrapu et al. disclose all the subject matter as discuss in claim 48 except the signal combiner comprising a frequency multiplexer.

However, Chitrapu discloses a frequency multiplexer (428 in figure 4) that combines the various control signals into one signal (paragraph 0022, lines 16-18).

It is desirable for the signal combiner comprising a frequency multiplexer because it prevents the need for duplicate processing circuit and simplify the combining processor. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Chitrapu et al. in the system of Caimi et al. and Pratt to reduce the complexity of the system.

10. Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Caimi et al. (US 2004/0227683 A1) in view of Nuutinen et al. (US 2003/0016771 A1) and Pratt (US6,664,921 B2) as applied to claim 48 above, and further in view of Lee (US 6,473,416 B1).

Caimi et al., Nuutinen and Pratt disclose all the subject matter as discuss in claim 48 except the signal combiner comprising a code division multiple access multiplexer.

However, Lee discloses a code division multiple access multiplexer (mux 100 in figure 3) that combines signals inputted through a plurality of channels (column 4, lines 39-41).

It is desirable for the signal combiner comprising a code division multiple access multiplexer because it prevent the need for duplicate processing circuit. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Chitrapu et al. in the system of Caimi et al. and Pratt to reduce the complexity of the system.

11. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Caimi et al. (US 2004/0227683 A1) in view of Nuutinen et al. (US 2003/0016771 A1) and Pratt (US6,664,921 B2) as applied to claim 48 above, and further in view of Yin (US 2005/0218984 A1).

Caimi et al., Nuutinen et al. and Pratt disclose all the subject matter as discuss in claim 48 except the signal combiner comprising a bypass, such that a carrier signal from the at least one of the pluralities of antennas can bypass the signal combiner.

However, Yin discloses a combiner (int frmr 216 in figure 2) that has a bypass mode and when the combining function of the combiner is not required, the combiner is bypassed (paragraph 0050,lines 16-18).

It is desirable for the signal combiner comprising a bypass, such that a carrier signal from the at least one of the pluralities of antennas can bypass the signal combiner because it can reduce process time for the system. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Yin in the system of Caimi et al., Nuutinen et al. and Pratt to reduce the processing time of the system.

12. Claims 54 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caimi et al. (US 2004/0227683 A1) in view of Nuutinen et al. (US 2003/0016771 A1) and Pratt (US6,664,921 B2) as applied to claim 48 above, and further in view of Naidu et al. (US 6,128,470).

(1) Regarding claim 54:

Caimi et al., Nuutinen et al. and Pratt discloses all the subject matter as discuss in claim 12 except the analog-to-digital converter and the digital processing assembly being located at a first location, and a first of the at least one antenna being located at a second location, spatially remote from the first location.

However, Naidu et al. discloses the analog-to-digital converter and the digital processing assembly being located at a first location, and a first of the at least one antenna being located at a second location, spatially remote from the first location (the system comprises a plurality of remote antenna unit 68_1, 68_2, 70_1, 70_2 connect to the base station equipment 50_1 and 50_2 in figure 2, column 1, lines 43-54).

It is desirable for the analog-to-digital converter and the digital processing assembly being located at a first location, and a first of the at least one antenna being located at a second location, spatially remote from the first location because it reduces the cumulative noise in a distributed antenna network (column 2, lines 48-50). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Naidu et al. in the system of Caimi et al., Nuutinen et al. and Pratt to improve the quality of the system.

(2) Regarding claim 55:

Naidu et al further discloses that a second of the at least one antenna being located at a third location, spatially remote from the first location and the second location (the system comprises a plurality of remote antenna unit 68_1, 68_2, 70_1, 70_2 connect to the base station equipment 50_1 and 50_2 in figure 2, column 1, lines 43-54).

13. Claims 57, 58 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caimi et al. (US 2004/0227683 A1) in view of Pratt (US6,664,921 B2).

(1) Regarding claim 57:

Caimi et al. further disclose a signal combiner (combiner 144 in figure 19) that combines the analog signals from the plurality of antenna into a multi-carrier signal (since each filter/antenna 136A-136C is with a different center frequency, the output of the combiner 144 is a multi-carrier signal, paragraph 0074-0075).

Caimi et al. fails to disclose an analog-to-digital converter that converts the analog multi-carrier signal into a digital multi-carrier signal.

However, Pratt discloses an analog-to-digital filter after the combiner 155 in figure 4 that creates a digital representation of each analog signal (ADC 165 in figure 4, column 9, lines 60-65).

It is desirable to have an analog-to-digital converter that creates a digital representation of each analog signal because digital data can withstand interference better than analog signal. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the teaching of Pratt in the system of Caimi et al. to improve the reliability of the system.

(2) Regarding claim 58:

Pratt further discloses a combiner comprising at least one mixer (mixers 150C) for downconverting analog signals, a given mixer being associated with a respective one of the at least one antenna and having an associated intermediate frequency (the

mixers 150C serve as down converters, converting the received signals to an intermediate frequency, column 9, lines 57-59).

It is desirable for the combiner comprising at least one mixer for downconverting analog signals, a given mixer being associated with a respective one of the at least one antenna and having an associated intermediate frequency because it can remove interference in the signal. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the teaching of Pratt in the system of Caimi et al. to improve the performance of the system.

(3) Regarding claim 61:

Pratt further discloses that the signal combiner (combiner 155 and PRBS code generator 153) comprising a plurality of coders (code 1 to K) that provide respective spreading codes to the analog carrier signals, the respective spreading codes being mutually orthogonal (column 9, lines 46-51, the despreading codes may be signals constituting an orthogonal set, column 4, lines 20-21).

14. Claim 59 is rejected under 35 U.S.C. 103(a) as being unpatentable over Caimi et al. (US 2004/0227683 A1) in view of Pratt (US6,664,921 B2) as applied to claim 57 above, and further in view of Chitrapu et al. (US 2006/0072520 A1).

Caimi et al. and Pratt disclose all the subject matter as discuss in claim 57 except the signal combiner comprising a frequency multiplexer.

However, Chitrapu discloses a frequency multiplexer (428 in figure 4) that combines the various control signals into one signal (paragraph 0022, lines 16-18).

It is desirable for the signal combiner comprising a frequency multiplexer because it prevent the need for duplicate processing circuit. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Chitrapu et al. in the system of Caimi et al. and Pratt to reduce the complexity of the system.

15. Claim 60 is rejected under 35 U.S.C. 103(a) as being unpatentable over Caimi et al. (US 2004/0227683 A1) in view of Pratt (US6,664,921 B2) as applied to claim 57 above, and further in view of Lee (US 6,473,416 B1).

Caimi et al. and Pratt disclose all the subject matter as discuss in claim 57 except the signal combiner comprising a code division multiple access multiplexer.

However, Lee discloses a code division multiple access multiplexer (mux 100 in figure 3) that combines signals inputted through a plurality of channels (column 4, lines 39-41).

It is desirable for the signal combiner comprising a code division multiple access multiplexer because it prevent the need for duplicate processing circuit. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Chitrapu et al. in the system of Caimi et al. and Pratt to reduce the complexity of the system.

16. Claim 62 is rejected under 35 U.S.C. 103(a) as being unpatentable over Caimi et al. (US 2004/0227683 A1) in view of Pratt (US6,664,921 B2) as applied to claim 57, and further in view of Yin (US 2005/0218984 A1).

Caimi et al. and Pratt disclose all the subject matter as discuss in claim 57 except the signal combiner comprising a bypass, such that a carrier signal from the at least one of the pluralities of antennas can bypass the signal combiner.

However, Yin discloses a combiner (int frmr 216 in figure 2) that has a bypass mode and when the combining function of the combiner is not required, the combiner is bypassed (paragraph 0050,lines 16-18).

It is desirable for the signal combiner comprising a bypass, such that a carrier signal from the at least one of the pluralities of antennas can bypass the signal combiner because it can reduce process time for the system. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Yin in the system of Caimi et al. and Pratt to reduce the processing time of the system.

17. Claims 63 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caimi et al. (US 2004/0227683 A1) in view of Pratt (US6,664,921 B2) as applied to claim 57 above, and further in view of Naidu et al. (US 6,128,470).

(1) Regarding claim 63:

Pratt and Caimi et al. discloses all the subject matter as discuss in claim 12 except the analog-to-digital converter and the digital processing assembly being located

at a first location, and a first of the at least one antenna being located at a second location, spatially remote from the first location.

However, Naidu et al. discloses the analog-to-digital converter and the digital processing assembly being located at a first location, and a first of the at least one antenna being located at a second location, spatially remote from the first location (the system comprises a plurality of remote antenna unit 68_1, 68_2, 70_1, 70_2 connect to the base station equipment 50_1 and 50_2 in figure 2, column 1, lines 43-54).

It is desirable for the analog-to-digital converter and the digital processing assembly being located at a first location, and a first of the at least one antenna being located at a second location, spatially remote from the first location because it reduces the cumulative noise in a distributed antenna network (column 2, lines 48-50). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Naidu et al. in the system of Caimi et al. and Pratt to improve the quality of the system.

(2) Regarding claim 64:

Naidu et al further discloses that a second of the at least one antenna being located at a third location, spatially remote from the first location and the second location (the system comprises a plurality of remote antenna unit 68_1, 68_2, 70_1, 70_2 connect to the base station equipment 50_1 and 50_2 in figure 2, column 1, lines 43-54).

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ishikawa et al. (US 5,408,690) discloses an antenna supervising apparatus comprising a standing wave ratio measuring unit.

Zhu et al. (US 2002/0047494 A1) discloses a programmable surface acoustic wave (SAW) filter.

Toivola (US 6,081,515) discloses a method and arrangement relating to signal transmission.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SIU M. LEE whose telephone number is (571)270-1083. The examiner can normally be reached on Mon-Fri, 7:30-4:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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8/28/2008

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